Equine Research News
A digital presentation of Grayson-Jockey Club Research Foundation
Providers of Equine Research From 1940 thru 2017
Issue 6 • 2017

R. EQUI PNEUMONIA: DOES MAGNITUDE OF AIRBORNE EXPOSURE PREDICT DISEASE DEVELOPMENT

An interview with Dr. Noah Cohen, by Jamie Haydon

This interview discusses one of five research projects on *rhodococcus equi* funded by Grayson-Jockey Club Research Foundation and conducted by Dr. Noah Cohen in recent years. Pneumonia is a leading cause of death among foals, and the most common form of foal pneumonia is caused by *R. equi.* Dr. Cohen's most recent ongoing work on foal pneumonia is seeking a vaccine.

> "There is so little funding for equine research that each grant awarded has enormous impact... these grants sustain our research programs. . . The ripple effects from each individual research project are enormous."

Dr. Noah Cohen, *VMD, MPH, PhD, DACVIM* • *Professor & Associate Department Head -Texas A&M University*

What first sparked your intellectual curiosity to explore this area of equine research?

There were many sparks. First, Dr. Ronald Martens included me in his rhodococcus equi research program. His passion for solving this problematic disease was inspirational and motivational. Second, I've always been a fan of challenging puzzles. Trying to elucidate the complex relationship involving the bacterial organism, the environment in which both the bacterial and mammalian (foal) organisms live, and the mammalian host (foal) is quite a tough nut to crack. Third, Dr. Gary Muscatello and his colleagues from Australia did pioneering work on quantifying airborne R. equi in horse environments. Their good work was clearly the most proximate spark.

Have you studied this area of equine research before?

We have been studying the epidemiology of R. equi for some time. From the standpoint of the environment, we had been looking at concentrations of R. equi in feces and soil (as well as management practices). But the work from Gary Muscatello and his colleagues made it clear that studying airborne concentrations was important.

What was the most significant finding from this research?

Gary Muscatello and colleagues were first to demonstrate that airborne - but not soil - concentrations of R. equi were positively associated with the cumulative incidence of R. equi pneumonia on Thoroughbred farms in Australia. There were higher concentrations in air on farms that had higher incidence of disease. But it wasn't clear from that seminal work whether the higher concentrations were a cause of disease

Continued on page 2

(i.e., more R. equi in air caused more foals to get sick) or an effect of disease (more sick foals were putting out more R. equi into their environment). We also had no information about air concentrations of R. equi from farms in North America. The principal significance of our work is that we were able to show that airborne concentrations were higher in stalls of foals that went on to get R. equi pneumonia than in stalls of foals that did not get pneumonia.

Because the higher concentrations were detected before disease, this indicates a causal relationship (because causes must precede effects). This was important evidence of the role of environment in the disease, and indicated that reducing airborne concentrations could help to prevent the disease in foals, particularly in foaling stalls.

Another important finding was that concentrations of R. equi in the air were higher at times during the day when there was greatest activity (human or horse) in barns. This suggested that perhaps mucking out, etc., should be done when mares and foals are out of the barn so as to reduce exposure to higher concentrations of R. equi in air.

What, if anything, surprised you about your findings?

We also compared concentrations between barns and paddocks/pastures and among locations in barns. I expected that the airborne concentrations in the "better ventilated" stalls near entryways and more peripheral would have lower concentrations. But this wasn't always the case. The great (equine researcher) Dr. Ed Robinson suggested to me that greater exposure to winds might make those stalls have more particulates in air on which R. equi would be borne. I thought that was a significant observation.

What did you learn about the research process through your project?

Many things! They included the challenges of collecting samples in Kentucky and sending them to Texas, the challenges of working with many farms, the willingness of farm managers in Central Kentucky to help with sample collection, the importance of having outstanding collaborators when research is being done in different states. In particular, Drs. Jackie Smith and Craig Carter from the University of Kentucky's veterinary diagnostic laboratory helped make this work possible.

How will this research improve equine health and welfare?

It will only help directly if it is built upon, which we are pursuing. We need to try to see if approaches to reducing airborne concentrations of R. equi might be effective at reducing the incidence of disease. There is no reason to expect that this will be completely effective, but it might help.

One important way that it helped indirectly was that it provided further evidence to us that preventing this disease would require being able to protect newborn foals. Thus, we shifted our vaccine work from trying to vaccinate foals (which would take at least a couple of weeks before they might provide protection) to vaccinating pregnant mares, so that they could provide protection by transferring immunity to their foals.